

Inventa sunt specula ut homo ipse se nosset

Francis Rousseaux[‡]

Université de Reims Champagne Ardenne, France

E-mail: francis.rousseau@univ-reims.fr

Abstract

When we specify enactive systems leading to an immersion into virtual worlds, we find it natural to give priority to solutions of cognitive continuity, supposed to make the crossing of real/virtual borders easier¹. Thanks to clever devices carefully elaborated, the users can get the illusion of a perfect ambivalence of interactive relations they are developing in real/virtual environments.

We are thus in favour of user-friendly systems, whose appropriation should thus be obvious to all.

This hypothesis is so widespread and so rarely explained that it remains widely un-thought. However, examples of person/device couplings are numerous, and even though they are restrictive, they remain nonetheless attractive or fascinating: violin or golf players can testify to this.

We suggest discussing the surprising appropriation we spontaneously have of such a common and stupefying instrument as a mirror. Indeed, mirrors play a very important role in our perception of the numerous movements of our body, for instance when we are shaving or putting on make-up.

1. The surprising example of our mirrors

Let us now consider these familiar instruments we use in our everyday lives, whoever and whatever we are, either a dancer, a hairdresser, a car driver or simply a reader of *Enactive*⁷07.

Nothing will ever prevent a young woman from using her pocket mirror to check her make-up wherever she is. However, to improve it, she must first

¹ «The systematic approach to interaction design is characterized by a study of user tasks, existing interaction techniques, and characteristics of the user, environment, or system that might affect performance. In general, this approach is slow and methodical, with incremental improvements in performance rather than sudden leaps», Doug A. Bowman, Kruijff, LaViola, and P. Iaz. An introduction to 3D user interface design. 2001

appropriate her own image in the reflection of the mirror, so as to check her work with her subtle beauty instruments. How can we recognise such a reflection as our own image? According to Husserl or Merleau-Ponty, the usual way of constituting the objects around us is what we call “the sketch donation”. Let us examine if such a donation is compatible with mirrors.

2. The “sketch donation” phenomenology

When we are in motion, we can recognize the volumes of the objects we are unable to move. To do so, we work on the bypassing of the object. This process can be seen as a combination of positive isometrics, isometrics being transformations that keep distances as they are, and thus do not distort the transformed object. They are positive when they keep the internal sides and aspects of the object as they are. Within this combination of isometrics –mainly translations and rotations– that gives us access to the object we are aware of, rotation is essential to discover its hidden parts and to come to an adequate knowledge of it. Here, Husserl would talk of “sketch donations” to indicate that the perceptions of the object are always fragmented, and of “filling constitutions” to give meaning to the synthesis that leads us to a unified representation. In virtual reality, this is the way we create volumes: by scanning during motion capture operations, or by synthesis of 2D images. But through the mirror, nothing goes right! No possible filling: the reflected movement of my gaze yields sketches that do not lend themselves to a passive synthesis, but go on leading us to short-lived donations. In front of the mirror, we are inclined to recognise our own image, with only one exception: the *inversion* of laterality. Indeed, negative isometrics such as symmetry do not exist in nature except in the mirror and constitute a provocation to common sense, thus explaining our narcissistic fascination with it. The image that I see is a double of my face that faces me as in a face to face, and I could replace it by turning down or stepping back. This is the way we recognise our own images in mirrors.

3. The bypass of the “sketch donation”

When we are doing this, we are trying to turn by thought a 2D symmetry (negative isometric) to a rotation (positive isometric), which is geometrically impossible, except if we adapt to the illusion, and claim there is a left-right inversion. We thus reinforce Husserl’s constitution with a virtual gesture that consists in being ourselves here at the same time as another there, in front of us.

Then, our own image in the mirror needs a *virtual* movement to be recognised as such, and it is so, regardless of geometry, which has at the same time prejudicial consequences for the one who is looking since he has to sacrifice the laterality of his movements and be prisoner of the reflection world. This gesture marks the start of a different kind of identification that no act donation will ever correspond to. Instead, we rather have sketch donations led by a fake who is just our own reflection, and this is not unsafe: as the 2D image of a 3D object cannot be understood without its prolongation in a 3D scene, its understanding depends only on its interpretation. If we call 3D we the space that enables us to make a sketch donation with real movements, we can imagine the virtual 3D space as the minimal space that permits the synthesis of virtual sketches.

4. Conclusion

Mirrors are far from being the user-friendly instruments that their generalised appropriation makes us tend to believe. On the contrary, the productivity they give comes with an extreme cognitive constraint, whose relaxation can only be obtained through the distortion of the most fundamental principles of geometrical topology. However, these strange instruments make us live a fascinating and fundamental experience that none of us would abandon, even though it can also be very alarming.

Our research and development of enaction tools and an enaction environment could cast doubt on the methodological un-thought of the “convivial whole”

and lead to daring deep cognitive breaks. But is it worth it?

References

- [1] Doug A. Bowman and C.A. Wingrave. Design and evaluation of menu systems for immersive virtual environments. In *Proc. IEEE VR'2001*, 2001.
- [2] Doug A. Bowman, Kruijff, LaViola, and P. Iaz. An introduction to 3D user interface design. *Presence 10 (1)*, 2001.
- [3] Doug A. Bowman, D. B. Johnson, and L. F. Hodges. Testbed evaluation of virtual environment interaction techniques. In *VRST '99: Proceedings of the ACM symposium on Virtual reality software and technology*, pages 26–33, New York, NY, USA, 1999. ACM Press.
- [4] Enactive'06, Third International Conference on Enactive Interfaces, Montpellier (France): November 20-21, 2006
- [5] Jean-Christophe Bailly, *Le versant animal*, Bayard Centurion, 2007
- [6] Jorge Luis Borges, *Œuvres complètes*, La Pléiade Gallimard, 1993
- [7] Lewis Carroll, *Tout Alice*, Garnier-Flammarion, 1979
- [8] Gilles Deleuze, *Différence et répétition*, Presses Universitaires de France, 1968
- [9] Eugen Fink, *Le jeu comme symbole du monde*, Les éditions de minuit, 1966
- [10] Edmund Husserl, *Idées directrices pour une phénoménologie*, Tel Gallimard, 1950
- [11] Agnès Minazzoli, *La première ombre*, Les Editions de Minuit, 1990
- [12] Friedrich Nietzsche, *Ainsi parlait Zarathoustra*, Gallimard - Folio / essais n° 8, deuxième partie : “ L'enfant au miroir ”, pages 108-109, Paris, 1985
- [13] Andreï Tarkovski, *Zerkalo (Le miroir)*, film 106 min, couleur, avec Margarita Terekhova, Oleg Lankovski, Philip Lankovski et Ignat Daniltsev, URSS, 1974
- [14] Hermann Weyl, *Symétrie et mathématique moderne*, Champs Flammarion, 1964